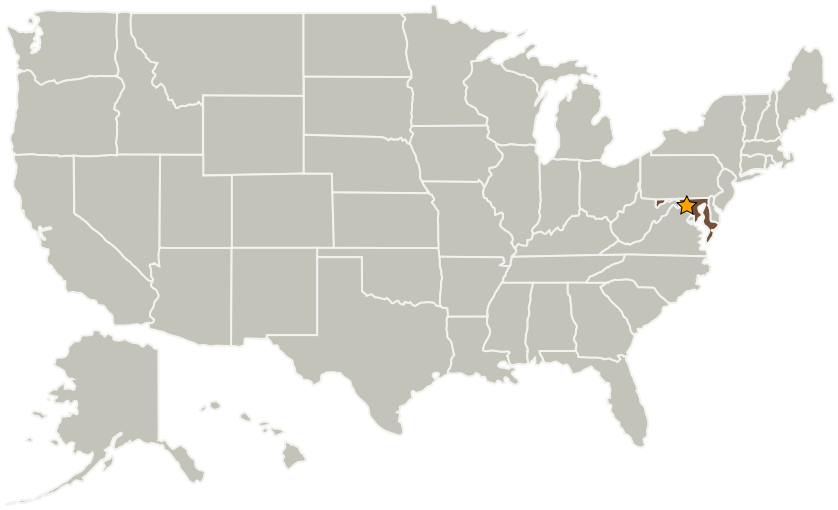
Reconfigurable L-band Radar Transceiver using Digital Signal Synthesis, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

IAI proposes to develop a reconfigurable L-band radar transceiver module. The emphasis will be to implement most of critical radar functionalities like: • Baseband modulation signals • Orthogonal high frequency pseudo random codes for pulse compression • Direct Digital synthesis (DDS) or numerically controlled oscillators (NCO) for generating RF carrier reference signal • DDS driven Frequency sweep for FMCW (Frequency Modulated Continuous Wave) radar functionality • Sigma-Delta technique to direct carrier synthesis • Received signal processing to generate I/ Q components on a single embedded platform. Such a platform will be a combination of high speed DSP and FPGA on one board. This will considerably reduce the component count and form factor for a radar transceiver design. By simply programming an FPGA with a different "bitstream" file, we can control the radar functionality as pulse modulated or frequency modulated. This work will be synergistic with ongoing efforts at IAI, which involves L-band radar design. Advantages of such a system are: • Reconfigurable radar transceiver, not just in operational bandwidth/ carrier, but also in modulation (pulsed/ frequency swept) • Low form factor • Low power consumption

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations
Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Arvind Bhat

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.1 Situational and Self Awareness
    - TX10.1.1 Sensing and Perception for Autonomous Systems